



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,259	07/03/2001	Eiji Nakashio	09792909-5083	1899

7590

08/07/2003

David R. Metzger
SONNENSCHN NATH & ROSENTHAL
P.O. Box # 061080
Wacker Drive Station, Sears Tower
Chicago, IL 60606-1080

EXAMINER

BEACHAM, CHRISTOPHER R

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 08/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/898,259

Applicant(s)

NAKASHIO ET AL.

Examiner

Christopher R. Beacham

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (US 6,256,178) in view of Sato (US 6,369,984 B1).

• Regarding claims 1, 2, 6 and 7, Gill shows a magnetic tunnel effect type magnetic head comprising:

a first soft magnetic conductive layer 80, which is to provide a lower shielding, layer;

→ a metal oxide layer 235 and a first nonmagnetic conductive layer, formed on the first soft magnetic conductive layer, to provide a lower gap layer. ^{280(?)}

a magnetic tunnel junction layer 230 formed on the first nonmagnetic conductive layer to provide a magnetic tunnel junction effect;

a second nonmagnetic conductive layer 225 formed on the magnetic tunnel junction layer 230 to provide an upper gap layer; and

a second soft magnetic conductive layer 82 formed on the second nonmagnetic conductive layer 225 to provide an upper shielding layer;

the spacer layer 235 of the lower gap layer is disposed beneath at least the magnetic tunnel junction layer (see Figure 14).

Gill teaches that a metal oxide layer 235 that may be made from aluminum oxide, aluminum nitride or silicone dioxide and is sandwiched between the first and second shield layers (col. 8, lines 26-28). Additionally, Gill discloses a non-conductive insulation layer being located between the antiferromagnetic pinning layer and the first shield layer in the track width (col. 9, lines 28-30).

Gill does not disclose the surface of the metal oxide layer being mechanically and chemically polished to a smooth layer.

However, Sato teaches surfaces of various layers can be polished by so-called CMP (chemical and mechanical polishing) (col. 14, lines 25-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to polish the metal oxide layer of Gill with the CMP method as taught by Sato.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to polish the metal oxide layer of Gill with the CMP method as taught by Sato so that the layer can be smooth and free of pinholes, which would electrically short the junction between the layers.

- Regarding claims 5 and 10, Gill shows the apparatus being of a yoke type in which the magnetic tunnel junction element is not exposed from a medium-opposite face (see Figure 10).

- Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (US 6,256,178) as applied to claims 1 and 6 above.
- Regarding claims 3 and 8 Gill does not set forth the dimensions in these claims. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the metal oxide layer of Gill with the claimed dimensions through routine experimentation and optimization in the absence of criticality.

Response to Arguments

Applicant's arguments with respect to claims 1 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

- Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

- The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:
 - a. Sato et al. (US 6,466,403 B1) is cited to show a thin film magnetic head having a very narrow track width and manufacturing method for the same by disclosing the CMP method to polish the various layers.
 - b. Sato (US 6,456,461 B1) is cited to show a thin film magnetic head having improved accuracy in setting gap depth position.

Art Unit: 2653

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Beacham whose telephone number is (703) 605-4256. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



Christopher R. Beacham
Patent Examiner
Art Unit 2653
July 30, 2003



WILLIAM KORZUCH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600